

We were met at the Creek by Mr. C. Blair, of the Vermin Branch of the Department, and in his ear we left the fence to avoid rough sandstone hills, and after travelling several miles through station country, we struck it again in typical pindan country. *Triodia pungens* is the dominant ground cover, while the shrubby element is provided by *Grevillea Wiekhami*, *Erythrophloeum labouchei* and several species of *Acacia*, chief among which are *A. trachycarpa* and *A. tumida*. Occasionally the spinifex plain is broken by rugged sandstone outcrops on which is a white-barked species of *Eucalyptus* attaining considerable size, and reputed to have a bark of particularly high tannin content. This pindan country persists almost to the coast, where other shrubs, chiefly Cadjiput (*Melaleuca spp.*), enter the association, which finally gives place to saline flats and mangrove swamps on the coast. The fence follows high ground and enters the sea at the tip of Cape Keraudren, at the southern extremity of the Eighty Mile Beach.

During the course of the trip along the fence, a comprehensive collection of 436 sheets of botanical specimens was made. Although the season was well advanced and many of the species, particularly in the families Gramineae and Verbenaceae, were past the flowering stage, the collection is fairly representative of the flora, and it is hoped that when all the specimens have been identified, it will provide interesting additional information on the distribution of known species as well as providing several new ones.

This is the first occasion on which a detailed investigation of the area has been made, and I would like to express my thanks to Mr. C. A. Gardner, the Government Botanist, and to Mr. Wild, for making my trip possible.

OBSERVATIONS OF SEA BIRDS ON A VOYAGE FROM MELBOURNE TO ENGLAND, 1947

By Captain MARK TAYLOR, R.N., Stansfield, Suffolk, England.

I left Melbourne in the m.v. *Port Fremantle* on June 28, 1947, bound for Newcastle, England, via Fremantle and Cape Town; and was fortunate to have with me two of the essentials for watching birds at sea, a pair of good binoculars and a copy of W. B. Alexander's *Birds of the Ocean*.

Even with these aids the identification of the petrels is by no means easy. The fleeting glimpses over the crests of the swell, usually at a distance and in changing lights, make observation of detail difficult. I have always found that the only way to achieve accurate notes is to have a notebook already made out in headings under which a long-suffering fellow passenger may be induced to write the details as momentarily observed and dictated. Suggested headings and sub-headings are:—Bill. Head: crown, face, chin. Upper-parts: neck, back, tail-coverts, tail. Under-parts: throat, breast, belly, tail-coverts, tail. Wings: upper, under. Legs and feet. Characteristics: size, flight, numbers, etc. Without such aid it is

usually impossible to take notes quickly enough single-handed, and only a phenomenal memory can retain all details for subsequent logging.

Melbourne to Fremantle, June 28—July 2

The weather was cool (average air temperature, 58°F.) but unusually calm, with light variable winds and a slight westerly swell.

The most plentiful bird was the Black-browed Albatross (*Diomedea melanophrys*), daily numbers varying from 15 to 40. A few Wandering Albatrosses (*Diomedea exulans*) were seen each day; and single Sooty Albatrosses (*Phoebastria fusca*) were seen nine times between Melbourne and Cape Leeuwin.

Petrels were few; two Cape Pigeons (*Daption capense*) were seen on each of the first two days and in the middle of the Bight (Longitude 135° to 122°E.) 10 Fluttering Shearwaters (*Puffinus gavia*).

A dozen Southern Skuas (*Catharacta antarctica*) joined off the Leeuwin and remained with the ship all day.

Fremantle to Cape Town, July 7—22

In order to avoid heavy westerly weather, the captain set a north-westerly course to pick up, and then follow, the 30°S. parallel. In consequence the ship made better time than she would have done had she been on a more southerly and shorter course, as reports were received from other ships of heavy westerly winds and seas on and south of 36°S. The weather in 30°S. was fair, with variable winds never strong except in small local disturbances, and little swell.

The Black-browed Albatross was not seen again for many days after leaving Fremantle; and for the first four days from one to three Yellow-nosed Albatrosses (*Diomedea chlororhyncha*) were seen daily following the ship. Wandering Albatrosses, in numbers from one to eight, were seen almost daily throughout the passage.

One Southern Skua followed for a day from Fremantle; and another was seen three days before Cape Agulhas.

Four Great-winged Petrels (*Pterodroma macroptera*) were seen on the first two days out of Fremantle, and two more in mid-ocean, Longitude 55° and 36° E. Three small flights of the Soft-plumaged Petrel (*Pterodroma mollis*) were seen on the first three days out, and three Cape Pigeons were seen at intervals in mid-ocean.

On July 16 in Longitude 55°E. a sharp local storm was encountered, with heavy rain and line squall. With it appeared a dozen Schlegel's Petrels (*Pterodroma incerta*), six Soft-plumaged, one Great-winged and three Cape Pigeons. The Schlegel's Petrels increased to 40 on the following day, in small parties of from six to eight birds, and then daily decreased in numbers, no more being seen after Longitude 36°E. It was noted that all the Schlegel's Petrels seen had a very small white mark on the anterior angle

of the wing. This is not mentioned in any reference book to which I have as yet had access. Mr. Alexander suggested to me that it might be a pale feather in the bastard wing which had not been noted, and advised a visit to the British Museum of Natural History at South Kensington; but no skins there had any trace of white on the leading edge of the wings. The matter remains to be solved.

On July 19 the ship having entered the Agulhas Current, many Prions (*Pachyptila* sp.) were seen all day in flocks of several hundreds; the species could not be identified.

On July 21, the day before reaching Cape Agulhas, the sea temperature dropped 6°F. and the air 7°F. From the scarcity of birds throughout the previous weeks the change in numbers was astonishing. As far as could be seen through the glasses the air was full of birds, never less than 20 or 30 in their field. The Black-browed Albatross reappeared in hundreds and the White-chinned Petrel or Cape Hen (*Procellaria aequinoctialis*) appeared in thousands. Large Prion flocks of several hundred birds passed and re-passed every few minutes, and some 40 or 50 Sooty Shearwaters (*Puffinus griseus*) were seen during the day. The intensity of bird-life there had to be seen to be believed.

Cape Town to Canary Islands, July 23—August 15

Numbers of the Southern Black-backed Gull (*Larus dominicanus*) came round the ship on the first day out only, and 20 Cape Gannets (*Sula capensis*) were seen cruising and fishing.

The white-chinned Petrels, Sooty Shearwaters and Prions, which had been in large numbers off Cape Town, steadily diminished day by day, and no more were seen after Latitude 28°S. Cape Pigeons were seen up to Latitude 24°S.

The numbers of the Black-browed Albatrosses diminished as the ship made her northing, the last being seen on July 26 in Latitude 19°S.; this being the day that the ship left the zone of the south-east trades. The last albatross to be seen, a Wandering, was on the following day in Latitude 15°S. Two Sooty Albatrosses were seen on July 24 in Latitude 28°S.

On the night of July 26, a White-bellied Storm-petrel (*Fregetta grallaria*) was picked up half-stunned on deck. It was kept for the night in one of the officers' cabins, where it took occasional sips of the fresh water presented to it, and was released next morning in good order. It could not rise from a flat surface, so was allowed to scramble over the edge of a cargo hatch, becoming air-borne before it reached the deck. The fluttering butterfly-like flight of this species was most noticeably different from the stronger and more direct flight of the Wilson's Storm-petrel (*Oceanites oceanicus*) which followed the ship in large numbers (from 30 to 100) between Latitudes 10°N. and 25°N.

In Latitude 3°S. two Bos'n Birds (*Phaethon* sp., probably the White-tailed, *P. aethereus*) were heard round the bridge before dawn by the officer of the watch.

The Canary Islands were passed in a high N.E. wind, which probably kept local birds in shelter. The day before arrival there

alighted on board for a short while one European Swallow (*Hirundo rustica*) in juvenile plumage, and one European Hoopoe (*Upupa epops*).

Canary Islands to Newcastle, August 5—12

This part of the voyage was most disappointing in birds. One single Lesser Black-backed Gull (*Larus fuscus*) was seen off Ushant, and nothing else until the usual run of Herring Gulls (*Larus argentatus*) was picked up off the Casquets, and the normal English Channel birds from the Isle of Wight on.

Observations on the Albatrosses

Although the Wandering Albatross does not generally follow ships by night, a number were seen during the night of July 26, in the light of a nine-day moon, following in the lights of the ship until well after midnight. They were not here in the morning, and presumably left at moonset. The ship's officers confirmed that these birds do sometimes follow ships' lights all night in good moonlight.

An attempt was made to estimate the age-groups of the Wandering Albatrosses observed. No definite information was previously found (nor have I since been able to obtain any) of the exact annual variation in plumage of the immature birds. As an assumption for record purposes the variation was taken to be somewhat the same as the Southern Black-backed Gull, namely:

Group A, 1st year: brown plumage, white head.

Group B, 2nd year: generally grown, with white head and belly.

Group C, 3rd year: dark or mottled over back of wings.

Group D, 4th year: full white plumage with black wing-tips.

In the Great Australian Bight the four groups were more or less equally represented. Across the south Indian Ocean group, C predominated and group D was scarce. Groups B and C predominated west of Africa, no group D being seen. Full details are as follows:

Group.	Great Australian Bight.	Fremantle to Cape Town.	Cape Town to Lat. 15°N.
A	17%	21%	3%
B	25%	19%	} 97%
C	29%	57%	
D	29%	3%	0%

It has been suggested that this apparent lack of mature birds west of Africa may be accounted for by the adult female having brown vermiculated markings on the back; but no adult female skin that I subsequently examined at South Kensington had enough of these markings to be possibly grouped as C. The specimens were perhaps faded; at 30 paces they appeared only just "off-white". The birds of the south Atlantic are known to be darker than those of the south Indian Ocean; but anyhow the white males should have shown up if there. This attempt at an analysis

is therefore not entirely reliable, and confirmation would be of interest.

The Black-browed Albatross was observed during two periods of the voyage, from Melbourne to Fremantle, and off the African coast. It may or may not be relevant that this species appeared when the temperature of the sea-water was below 63-64°F. and not when it was above.

Conclusion

I cannot end without expressing my gratitude to members of the Western Australian Naturalists' Club for their kindness at Perth to a passing naturalist (*Nauta exulans*, sub-species *britannicus*) and saying how much I hope some day to renew my acquaintance with them, and with my other Australian friends, both clothed and feathered.

THE CAVE FOSSILS OF THE SOUTH-WEST

By L. GLAUERT, W.A. Museum, Perth

Although over 40 years have elapsed since the first discovery, as recent cave fossils, of animals whose past presence in Western Australia had never been suggested or suspected, curiously little interest has been shown in the subject, even in scientific circles. With a view to directing further attention to the study of this highly interesting cave fauna I have prepared a brief summary of the discoveries already made, including some which have not yet been published, and include a complete list of the species of mammals so far discovered in the various caves of the South-West. As an aid to students I have also added a list of published references on the original discoveries.

The Mammoth Cave

In 1904 the caretaker of the Margaret River caves, the late T. Connelly, whilst making a cutting at the top of a rock to improve a pathway, found to his surprise that the mass was not solid but that the rock was covered with bone-bearing, red cave-earth which had been protected from removal by a thick incrustation of carbonate of lime. In this earth were a number of bones and jaws with teeth which Connelly carefully preserved and subsequently handed to the late Lt.-Colonel E. A. Le Souef who brought them back to Perth.

They were subsequently handed to me for examination when it was found that they contained remains of an extinct member of the kangaroo family and of a gigantic Echidna.

In my report to the Caves Board I stated that they represented animals new to science. To the heavy-jawed Macropod I gave the name *Sthenurus occidentalis* as it was the first specimen of an animal of that genus found in Western Australia and differed in important details from the species already known from the Pleistocene deposits of eastern Australia. The giant Echidna, allied